hypernephroma exists as an entity it should have a definite and usually recognizable structure, but if it be decided that all growths arising from adrenal epithelium irrespective of histological details should be so designated, and at the same time the capability of adrenal cells to form a sarcomatous tumor be denied, the growth in question may be called a hypernephroma.

From the morphology of the cells, their fasciculated arrangement in some fields of both primary and secondary tumors, suggesting the structure of adrenal tissue, and finally from the pigmentation of the tumor cells, I have concluded that the cells of the growth developed from those of the zona reticularis of the right adrenal gland with possibly contribution from other cortical layers. That it was malignant in the ordinary sense is shown by the extensive metastasis, though local invasion in the primary situation was prevented by the resistant capsule.

The general appearance of the growth under the microscope is that of large round-celled sarcoma, with a tendency to alveolar arrangement in some fields. It unquestionably more closely resembles this class of growths than any other, and if it be desirable to give it a name, from its histological structure and from the probable histogenesis, I should call the growth a large round-celled adenoid melanotic sarcoma, believing that in the present unsettled state of our knowledge of the subject such tumors may be brought under the general class of sarcomata, however modified.

A CASE OF NARCOLEPSY, FROM A SPECIFIC INFECTION TRANSMITTED THROUGH FIVE GENERATIONS.

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In a recent article, F. Raymond (*Archives Gén. de Médecine*, 1905, No. 25) alludes to the pathological varieties of sleep, especially in relation to the states of slumber which are associated with some forms of cerebral tumors; and after describing the phenomena accompanying normal slumber, he mentions a condition which would seem to represent the border-line between normal sleep and the unconsciousness often accompanying recognizable lesions of the cerebral structures. He states that mental hebetude and abnormal slumberous conditions are often observed among the first indications of serious nervous or mental impairment—that is, an increased inclination to sleep which may or may not be associated with symptoms of disordered mental or motor activity—and varying in degree of intensity and diversity of direction, as well as in the character of its manifestation, and which may later progress to a stage of absolute coma. Among these somnolent conditions he includes narcolepsy, which was first so called by Gélineau (*Gaz. des Hôpitaux,* 1882), though the same condition had been recognized since 1861 by Casse, Marotte, Labbé, and others. Gélineau thought this disorder to depend upon a special neurosis, while Ballet believed it to be due to the action of some toxin of unknown nature within the body of the individual. This view has prevailed, with a few notable exceptions, among most of the observers who have reported such cases since the appearance of Ballet's communication.

True narcolepsy, according to Raymond, is characterized by a sudden and irresistible inclination to sleep, coming upon the individual outside the hours usually passed in slumber, and appearing with a more or less regular periodicity and with variable duration of the somnolency. He states that the person is overpowered by sleep in the midst of his ordinary occupations, and has noted the condition to arise under the most unexpected circumstances, even during meals at table. It is more frequently observed among persons who are subject to gout, rheumatism, or obesity, as well as in the course of the different autointoxications, renal, hepatic, and those due to gastrointestinal fermentations, etc. It may also accompany the different acute febrile infections. So far as I can determine from the material at my disposition, the actual specific agent of the supposed toxic action has not in any instance been detected or its nature defined.

I am able to present the notes of a case of narcolepsy in which the causative action of a specific infective agent is believed to be the source of the disorder. In this direction the heredity of the case is interesting.

The patient is a woman, about sixty-five years old, single. Her paternal grandfather was of old pilgrim stock, and was in early life strong and robust. He followed the sea, making some long voyages to the East, also to the various coasts of Europe, and during the period of the wars with England took some part in the maritime portion of that struggle. He was in the Port of St. Petersburg at the time of the disastrous retreat of Napoleon. He was married during his early manhood, at the most active period of his career. On his return from a long voyage he was found to be ill, and it is said that he had "the bad disease," for which he was under the treatment of that day for an indefinite time. Not much reliable information can be gathered upon that point at this late day, but the study of the lives of his descendants is, at the least, suggestive in diagnosis. This grandfather died in the '40s of the last century at an advanced age, leaving a large family, who all reached maturity, with the exception of one or two who died in infancy from unknown causes. Each member of this (the second) generation bore some inherited constitutional taint, but in each member of this generation the particular form of stigma varied from that of another. The following is a brief outline of the special features in eight of these individuals whom I will designate as A, B, C, D, E, F, G, H.

A. was a daughter, who resided in a large city, and was a highly cultured and very intellectual lady; excelling especially in musical and artistic ability, and occupying an enviable position in society. Her health was always delicate, and she suffered in middle life from some affection of the eyes, of progressive nature, for which no treatment was effective, and which resulted in total blindness. The malady was not the cause of physical pain, and her health was not apparently greatly impaired, as she went about for many years and enjoyed herself in a manner which was astonishing to those who knew of her affliction. She died at an earlier age than any of her family who had survived childhood, at about forty-five years. The cause of death is not known.

B was a son who married early and had a numerous family, concerning eight members of which I have fairly accurate information. B himself was able to work at his trade during almost his entire life, but at about the age of sixty he suffered from "rheumatism," of slow and chronic character. After a few years he was the subject of a gradual decline of mental power, and at length became almost an imbecile. There were no symptoms of general paralysis of the insane.

C was a son who married early and had three children. He was, during his younger years, in good health, but at about the age of thirty-five was the subject of a "gradual contraction of the joints of the trunk and of the limbs," so that his body was greatly deformed, and he became entirely helpless; for many years was bedridden. His general health remained good, and he died at about the age of sixty. It was impossible to employ any other receptacle for his interment than a box something like a packing-case, to hold his remains. The cause of his motor infirmity is not known. His last illness was an acute pulmonary disease.

D was a son, who married early and had five children. One of these is the subject of this communication. These children all grew to maturity, and with one exception are still living. D himself was of most excellent character, industrious and sober, and for many years presented no sign of stigmata of any kind. At about middle life, however, he gradually developed chronic chorea, which persisted throughout his remaining life and much impeded his activities, until, toward the end of his life, he was unable to do any kind of labor. The chorea was especially marked in the area of distribution of the seventh cranial nerves, and resulted in ataxia, and later in essential paralysis of all the facial muscles. The upper eyelids drooped, and he was obliged to lift the lid with his finger in order to look forward or upward. His mouth was always open, and his teeth gradually fell out until all were gone. His face hung in loose folds, and his former expression of features was lost. He could not chew his food, and when his teeth were finally lost it was frequently difficult for him to take sufficient nourishment. His speech was thick and indistinct from lack of control of the muscles concerned in speaking. Swallowing was difficult on account of ataxia of the pharyngeal apparatus, and he often choked while eating and always in drinking. Visual and auditory functions were normal. The head was continually carried far forward from weakness of the nuchal muscles, and the back of the neck was disproportionately long. The muscles of the trunk were less affected; the arms were only partially under voluntary control. The patient always shaved himself, though to the onlooker it seemed as if he must cut his throat at each motion. The legs were fairly strong, and he could walk considerable distances without fatigue. The gait was alcoholic rather than ataxic. His bodily condition did not materially change during many years, though his mental powers became weakened with advancing age, and he became peevish and irritable to a marked degree, though not actually demented. Coincident with the mental changes was a gradual progressive emaciation in flesh; what his condition might have become, had he lived to a more advanced age, it is of course impossible to say. He died at the age of seventy-six of some pulmonary affection after a short illness. There is no history of endocarditis or of acute rheumatism in his case. The course of the choreic infirmity in this patient somewhat resembles that described by Osler ("Remarks on the Varieties of Chronic Chorea and a Report upon Two Families of the Hereditary Form, with One Autopsy," *Journal of Nervous and Mental Disease,* February, 1893), in which he reports several cases of this disease. The patient whose choreic infirmity is incidentally described in the present communication does not, however, afford an example of the progressive nature of the malady, as pictured by Professor Osler; and his condition did not apparently suffer any noticeable change for many years. His decline in physical and mental vigor may reasonably be ascribed to senile changes which might be expected to appear at an even earlier stage in a patient so long affected with a serious disorder of the important co-ordinative nervous centres.

The pathology of chorea is not clear, and not much apparent gain has been made in reference to its causation or seat or the nature of its anatomical lesions, if any. The theory of a toxic origin has not been proved. Heredity, or at least transmissibility, seems more probable, and that the inherited taint is not necessarily essentially choreic in character in the ancestor. Chorea is not infrequently observed after the acute febrile infections, but is then usually of only transitory duration, and not chronic or progressive in character. If endocardial complications exist the course and progress of the disease may be dependent upon the nature and seat of the endocardial damage, and may or may not be of serious importance to the well-being of the patient in the future.

E was a daughter, and was well until about eighteen, when "some bone disease" developed, which was followed by deformity of the trunk (probably some carious affection of the spine). This healed after a time, and this person married and had three children, who were apparently normally developed, and seemed to be free from inherited taint. One of them, however, at about the age of eighteen, became the subject of obscure cerebral symptoms, which were followed by gradual impairment of the mental faculties, and led to a practically idiotic condition, and she died at about the age of thirty, almost an imbecile.

F was a son, who left home at about twenty and was never heard from later.

G was a daughter, who "was always very nervous," but did not develop special symptoms, so far as is known in the relationship. She died at an advanced age.

H was a daughter who was also "very nervous," but who developed no stigmata.

Of the second generation five members are known to have had offspring, numbering from one to eight. A short resume of these persons is appended.

A was blind and died in middle life without issue.

B had eight children, all of whom were strong and well until maturity, when several of them began to exhibit symptoms of the inherited stigma of disease. Five individuals of this family suffered from gradual impairment of vision, due to optic atrophy, which went on to total blindness in four, and in a fifth, sight was reduced to perception of light. One member was afflicted with some affection of the hip, which lasted for some years, and resulted in impairment of the joint and about two inches of shortening of the limb. Another suffered from mental trouble of melancholic type, and was under asylum care for a considerable time. She resided in a remote part of the country, and nearer information of her condition is lacking. All the female members of this family are neurasthenic, hysterical, and subject to constant fear of impending evil, which would seem to be grounded upon a justifiable state of reasonable apprehension of hereditary disease. Several of those who became blind have showed extension of the optic degeneration to the cerebral structures, with subsequent symptoms of softening, going on to slow impairment of the mental powers. None has presented signs of any acute meningeal complications.

C had three children, of whom one was dissolute and improvident, and was considered weakminded. He died in middle life from some unknown cause. One of the others was the subject of "hip and spinal disease," was seriously deformed, weak mentally, and died in middle life, the cause of death given by the family being that "she went into a decline." The remaining member of this family was weakminded, hysterical, vain, improvident, and unreliable; she died from some unknown cause in middle life. Thus there was no surviving issue.

D had five children. All of these were of decidedly "nervous" temperament and occasionally exhibited indications of motor incoordination, suggestive of the choreic affection from which D (the father) suffered, but no member of this generation has developed the condition to an appreciable degree.

In the fourth generation from the original ancestor in this family, there have been about twenty members. Of these, about fifteen are believed to be living. Three infants of this line died from some affection attended with convulsions, and another became dissipated and a vagabond, and is believed to be dead.

The remaining members, so far as known, are all of "nervous" temperament, but have not as yet developed any special tendencies toward any of the affections from which the former generations have suffered. It would seem that the original taint has become attenuated by successive dilution with healthier stock, until the original infective element has become practically extinct. There has been one infantile death in the fifth generation from convulsions, but the circumstances attending this case are not definitely described.

The patient who forms the real subject of this communication is of the third generation, a lady now about sixty-five years of age. She was well as a child, and left home at about eighteen, to engage in mercantile occupations, and has remained in the same employment and position ever since that time. She has resided with the family during all these years, and though depleted by the death of nearly all its members, she and her employer have remained together. These two now constitute the entire household.

The patient began to notice her infirmity at about twenty-two years, when the attacks are described as suddenly appearing in the form of an irresistible inclination to fall asleep. She became subject to somnolence at all times of the day, without known cause or apparent provocation by surrounding circumstances. Otherwise she seemed to be in her usual health. One attack afforded no protection from a recurrence of the same character, and she has been known to have a succession of them during the whole of an entire day. She seems to fall into a perfectly natural slumber, and can easily be roused by a call or by any unusual noise. She wakens readily, and is apparently unaware that she has fallen asleep. At other times the sleep is more profound, and she realizes that she has passed an appreciable interval in unconsciousness. She is never confused, or in any other way noticeable after the attack, and sleeps regularly at night, as other persons are accustomed to do. During a period of more than forty years the lady has suffered from this condition, without appreciable change in the character of the manifestations of the malady, though careful observers think that within ten years there has been a noticeable deterioration in her general mental condition; that she seems somewhat dull and has not her usual acute perception in matters in which she was formerly very accurate. It is now believed that she is suffering from diabetes, but of this I have no personal proof. Otherwise she seems as well as could be expected in a lady of her years; considering that she has constantly worked very hard at a taxing occupation, and has lost little time from illness, nor has she been accustomed to take time for relaxation or recreation. The attacks are now in no appreciable way different from those at first observed; and the mental decline may perhaps be due only to the approach of old age. Her figure is full and rather plump, her color is good considering her age, but is somewhat ashy in hue. Her appetite is good, her strength remains fairly good, but she feels "that she is not so strong as she was." For a time she "dieted," but now she "eats all she wants" without harm. She states that she has had a series of "diabetic ulcers" within the last few months, which have healed under mild treatment. Her sight has also become very weak, so that she can read only the largest print. This may be the result of long abuse of her eyes, or it may be simply another accompaniment of her age. There has been no pain or other acute symptom in her failing vision, and it may be connected with the diabetic (?) process. There is no history of acute rheumatism or endocarditis, nor of any other infective or constitutional disease. The thyroid is neither hypertrophied nor absent.[1]

Almost nothing is known of the pathology of narcolepsy. The description of its causes, written by Aretæus, comprises nearly all that we know at present.[2] He states: "Multus somnus refrigerat et resolvit et stupefacit." And further on: "Somnus multus crassitudinem corporis et ignavium facit, et nebulam quandam sensibus offendit; medoicris autem prodest." (Aretæus Cappadocis, Causis et Signis Morborum. Johannes Wigan Oxaniæ: MDCCXXIII.) (See Latin translation.) Andreus Pizlerus, writing almost fifteen hundred years later, states essentially the same thing in the following: "Præsumptio ergo, spiritus in organa sensum minus influere, sed poris cerebri obstructis vel obrui, vel impediri quo minus commercium cum objectis extrinsesis exerceri et conceptus ideales ut prius formari possint." (*Dissertatio Medica de Affectionibus Soporosis et Catelepsi*, a Aendrea Pizlero, Jenae, MDCCVIII.) He also quotes Horace (Satirum sive Sermonum, Lib. iii, v. 145 et seq.): "Quondam lethargo grandi est oppressus," etc.

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[1] Since the above was written, the urine of this patient has been examined by an authority whom I respect, with the following result: Color, light amber; reaction, strongly acid; specific gravity, 1012; sediment, very slight; albumin, very large trace, by three tests; reaction for sugar (glucose) gave absolute negative result. A confirmatory examination of the urine by another authority gave the same qualitative results.

[2] The contemporary of Galen, born A.D. 131, died near the end of that century.

Porter states that "it is not the length, but the character of the sleep and the associated symptoms that make narcolepsy a distinct disease."

Putzel, in a recent work on *Functional Nervous Diseases*, classes narcolepsy under the heading of "epileptoid sleep states," and remarks that " it is very probable that narcolepsy will find its appropriate place among the minor epilepsies, and occupy the borderland between the epileptic and the non-epileptic conditions." . . . "The narcolepsies in a general way are recognized not from their character, which is that of true sleep, but from the frequency of the attacks, suddenness of onset, and their irresistible nature."

Finally, a pathological form of sleep, or at least a slumberous condition, may be produced by some affections, or probably rather, infections, accompanied by recognizable lesions of the nervous system. Among other possible causes, it is now generally accepted that the invasion of the body by the parasite of trypanosomiasis is the potent causative agent of the series of progressive symptoms, which uniformly persist and usually lead to the development of that inevitably fatal disease, called for want of a better name, the "sleeping sickness."

The theory that narcolepsy is caused by some toxic action within the system, either of autogenous or extraneous origin, seems to be supported to some extent by the rather frequent reported association of the narcoleptic condition with diabetes or obesity, which latter are usually only observed at a much later period than the morbid inclination to sleep. It may be that its association with these two conditions is only accidental, or that the same causative action (possibly of metabolic character, or related to some chronic nervous impairment), may produce both the narcolepsy and later the symptoms of diabetes or of obesity. This would correspond with the known production of diabetes experimentally by traumatic injury of certain parts of the central nervous system. No definite information upon this correlation of symptoms in narcolepsy is yet available. The pathology of the affection is still shrouded in obscurity.

The treatment of the nervous phenomena has been much simplified since we have realized that nothing is definitely known of the causation of the symptoms. In the thesis of Pizler, to which reference has been made above, the treatment advised was sufficiently active if not efficient. He recommends cupping, leeches, venesection, irritant clysters, emetics, purgatives, even the moxa, with irritative applications to the hands, feet, and body, etc.

The modern conception of narcolepsy has gradually resulted in the abandonment of most of the remedial treatment formerly employed, until at present it consists almost entirely only of measures adapted to the hygenic and moral condition of the patient. If diabetic symptoms are detected they may be ameliorated by suitable diet and other treatment as indicated, and in some cases favorable results seem to have followed their exhibition; but no treatment thus far advised has seemed to effect any appreciable result (with one or two reported exceptions) in the direction of relieving the somnolency or in restoring the patient to a normal condition.

If this case be accepted as one of so-called "narcolepsy" (which, after all, is only one of the prominent symptoms of the disorder), as described by the authorities quoted above (and to my mind there can be no hesitation in so considering it), this affords some support to the theory of the "toxic" or "hereditary" or "transmissible" character of this obscure condition. The facts which would seem to support this theory date back to the third generation, antecedent to this patient, to a direct ancestor who was afflicted (according to the belief of trustworthy relatives) with an acquired infection of specific character which is known to be transmissible to posterity. The direct progeny of this ancestor, so far as known, all suffered from stigmata referable to direct inheritance, but not in the same way as that in which the original patient was affected. In all the direct offspring the disease appeared in the form of affections of the nervous system, with a strong predilection for the special senses. Some of the members of this generation suffered from degenerative changes in the special nerves of sight; some with troubles of irritative or cortical character; and some with affections of the co-ordinative or convulsive centres or distributions.

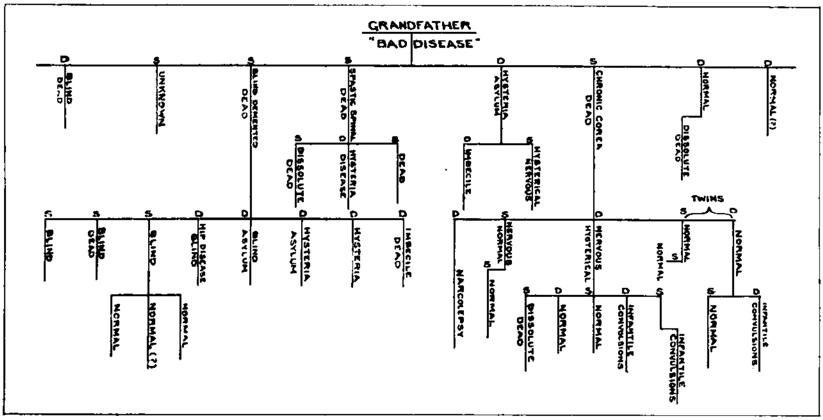
The results in the third generation are most appalling. Here were four members of one family stricken with blindness; four others were affected with organic or functional diseases of varying character, all referable to instability of the nervous system, and all tending to progressive degradation of the higher cerebral functions. In another line of the direct offspring the taint is observed in a convulsive form, impairing the motor functions, with terminal degeneration of the higher nerve centres. In still another the form is of a spastic character, lasting many years, but progressing to a final decay of the central intellectual functions. In short, each member of this unfortunate generation bore an inheritance of disease and death.

The condition called "narcolepsy" appeared in a member of the third generation, whose father was affected with chronic chorea. In another descendant of this father is found a series of deaths from infantile convulsions, and this tendency is transmitted in this line to the fifth generation from the original ancestor. Such an array of facts seems much more than a mere simple coincidence; and it appears rational to believe that this appalling history is a record of the results of one original acquired constitutional infection, appearing in a rather long line of cases, illustrating the varying forms which it may take. But the most striking fact is this, that in each member of this considerable number of individuals the transmission is in the form of some affection of the nervous system, leading by direct extension to further degenerative changes in higher and more important nervous machinery.

Another fact is also striking: that the inherited taint in the members who survived childhood appeared only after full maturity. This is noticed in relation to chronic chorea by Osler, who reports, as above mentioned, several cases of adult chronic chorea; but most of these cases progressed by a rather rapid course to terminal dementia. On one of these he was able to secure an autopsy, the results of which, however, did not essentially assist in defining the seat or the character of the supposed nervous lesion to which the disease is thought to be due. Aside from the careful clinical observations which have been made in the last few years no essential progress has been accomplished in relation to this obscure disease. Of its "Wesen" we are as ignorant as ever. It is not more remarkable that from the choreic father a daughter should develop narcolepsy than that her father should have developed chorea from an inherited constitutional taint which was not similar in his own father.

The pathology of narcolepsy is rendered more obscure, and the seat of the lesion to which it is supposedly due is more difficult to determine, from the fact that the disease is not often fatal, the death of those affected with it being more generally long delayed and due often to other and independent causes, such as diabetes or its consequences. In most of the cases reported the patients have either been lost sight of or have lived many years, finally succumbing to maladies unconnected with the nervous disorder. In chronic chorea, when the disease follows the course depicted by Osler, and the case progresses to terminal dementia, with the practical obliterations of all the mental faculties and functions, there may well occur a variety of histological changes in the more important higher centres which would be misleading. In the case of chronic chorea included incidentally in this communication the motor symptoms were for many years practically stationary in their manifestations, and the gradual deterioration of physical and mental vigor in the patient may reasonably be assigned rather to advancing senility than to the choreic degeneration with imbecility, described by Professor Osler. The patient died at a greater age than most individuals attain, and except for the infirmities connected with his disability and the difficulties sustained in his nutrition, owing to impaired deglutition for many years, he was as comfortable as most old people until nearly the end of his life. Unfortunately no autopsy could be obtained.

A family chart is appended, showing the distribution of the inherited constitutional infection in the line of offspring to the fifth generation.



Many of the references quoted in the "bibliography" attached have been consulted in their original form, and an effort has been made to confine the list to the subject of "narcolepsy" as closely as possible.

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